Transmission dynamics of 2019 novel coronavirus (2019-nCoV)

Year: 2020 | Citations: 456 | Authors: Tao Liu, Jianxiong Hu, Min Kang, Lifeng Lin, Haojie Zhong

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Abstract

Background Since December 29, 2019, pneumonia infection with 2019-nCoV has rapidly spread out from Wuhan, Hubei Province, China to most others provinces and other counties. However, the transmission dynamics of 2019-nCoV remain unclear. Methods Data of confirmed 2019-nCoV cases before January 23, 2020 were collected from medical records, epidemiological investigations or official websites. Data of severe acute respiratory syndrome (SARS) cases in Guangdong Province during 2002-2003 were obtained from Guangdong Provincial Center for Disease Control and Prevention (GDCDC). Exponential Growth (EG) and maximum likelihood estimation (ML) were applied to estimate the reproductive number (R) of 2019-nCoV and SARS. Findings As of January 23, 2020, a total of 830 confirmed 2019-nCoV cases were identified across China, and 9 cases were reported overseas. The average incubation duration of 2019-nCoV infection was 4.8days. The average period from onset of symptoms to isolation of 2019-nCoV and SARS cases were 2.9 and 4.2 days, respectively. The R values of 2019-nCoV were 2.90 (95%CI: 2.32-3.63) and 2.92 (95%CI: 2.28-3.67) estimated using EG and ML respectively, while the corresponding R values of SARS-CoV were 1.77 (95%CI: 1.37-2.27) and 1.85 (95%CI: 1.32-2.49). We observe a decreasing trend of the period from onset to isolation and R values of both 2019-nCoV and SARS-CoV. Interpretation The 2019-nCoV may have a higher pandemic risk than SARS broken out in 2003. The implemented public-health efforts have significantly decreased the pandemic risk of 2019-nCoV. However, more rigorous control and prevention strategies and measures to contain its further spread. Funding National Key Research and Development Program of China, Science and Technology Program of Guangdong Province, and Guangzhou Science and technology Plan Project.